WE CLAIM:

1. The limited mechanization complexity method of analyzing input radio frequency signals, said method comprising the steps of:

generating an approximation Fourier transformation of successive segments of said input radio frequency signals;

said approximation Fourier transformation segments including individual Fourier series terms having real magnitude and imaginary magnitude coefficients generated by multiplication of input signal determined coefficients by selected approximated Fourier transformation Kernel function coefficients;

said selected approximated Fourier transformation Kernel function coefficients including both integral unit and integral multiple unit possible component magnitudes over a real and imaginary value complex plane grid and defining a circular trajectory Kernel function location pattern over said real and imaginary value complex plane grid;

said selected approximated Fourier transformation Kernel function locations being dispersed in substantially equal angular increments around said defined circular trajectory Kernel function location pattern on said real and imaginary value complex plane grid;

generating said individual Fourier series terms from said input signal determined coefficients and from said Fourier transformation Kernel function coefficients having real magnitude and imaginary magnitude coefficients using a bit shift multiplication algorithm inclusive of multiple shift and add/subtract algorithm components;

said selected approximated Fourier transformation Kernel function locations being dispersed in an annular space inclusive of said circular trajectory on said real and imaginary value complex plane grid and being optimized with respect to including integral numeric values compatible with said bit shift multiplication algorithm having multiple shift and add/subtract algorithm components.

2. The limited mechanization complexity method of analyzing input radio frequency signals of claim 1 wherein said selected approximated Fourier

transformation Kernel function locations are also optimized with respect to generation of minimal spurious responses in said Fourier transformation.

3. The limited mechanization complexity method of analyzing input radio frequency signals of claim 1 wherein said selected approximated Fourier transformation Kernel function location defining a circular trajectory over said real and imaginary value complex plane grid includes Kernel function locations within and external of a Kernel function circle periphery.

4. The limited mechanization complexity method of analyzing input radio frequency signals of claim 1 wherein said selected approximated Fourier transformation Kernel function location complex plane grid includes grid dimensions of arbitrary and undefined unit magnitudes.

5. The limited mechanization complexity method of analyzing input radio frequency signals of claim 1 wherein said method of analyzing comprises determining input signal component frequency and component amplitude contents of radio frequency input signals of an electronic warfare radio receiver.

6. The limited complexity method of analyzing input radio frequency signals of claim 1 wherein said input radio frequency signals are two in number and are of five decibels difference in signal strength.

7. The limited complexity method of analyzing input radio frequency signals of claim 1 wherein said input radio frequency signals are two in number and are of ten decibels difference in signal strength.

8. The limited complexity method of analyzing input radio frequency signals of claim 1 wherein said selected approximated Fourier transformation Kernel function locations are between thirty two and two hundred fifty six in number.

9. The limited complexity method of analyzing input radio frequency signals of claim 1 wherein said selected approximated Fourier transformation Kernel function locations are equally and symmetrically disposed in four quadrants of said complex plane grid.

10. Approximated Kernel function utilizing receiver apparatus comprising the combination of:

a source of multiple frequency microwave radio frequency signals to be evaluated for signal component characteristics;

an implemented Fourier transformation algorithm connected with said source of multiple frequency microwave radio frequency signals;

said implemented Fourier transformation algorithm including a selected plurality of approximated Fourier transformation Kernel function locations, disposed within a complex plane plot of real and imaginary values, having selected integral unit real and imaginary component magnitudes and identifying locations received within an annular arc of selected radial thickness overlying said plot of real and imaginary values;

said implemented Fourier transformation algorithm including a bit shift multiplication realization, of shift, multiple shift and multiple shift plus a selected one of addition and subtraction characterization, executing simplified multiplication operations involving real and imaginary coordinate magnitudes of said Kernel function locations in said approximated Fourier transformation;

said selected approximated Fourier transformation Kernel function location coordinate magnitudes being elected to generate minimal spurious responses in an output signal of said implemented Fourier transformation algorithm;

said bit shift multiplication realization of multiple shift and multiple shift plus a selected one of addition and subtraction characterization, also being optimized, in shift, multiple shift and multiple shift plus a selected one of addition and subtraction realization complexity, by said selected approximated Fourier transformation Kernel function location coordinate magnitudes.

11. The approximated Kernel function utilizing receiver apparatus of claim 10 wherein said apparatus comprises an electronic warfare microwave radio frequency radio receiver.

12. The approximated Kernel function utilizing receiver apparatus of claim 10 wherein said source of multiple frequency signals comprises radio frequency signals of two differing operating frequencies.

13. The approximated Kernel function utilizing receiver apparatus of claim 10 wherein said selected plurality of approximated Fourier transformation Kernel function locations disposed within a complex plane plot of real and imaginary values received within an annular arc of selected radial thickness overlying said plot of real and imaginary values are disposed in a closed circular annular arc.

16. The approximated Kernel function utilizing receiver apparatus of claim 10 wherein said complex plane plot of real and imaginary values includes coordinate lengths of 1, 2, 4, 8, 16 and so-on units magnitude.

17. The approximated Kernel function utilizing receiver apparatus of claim 10 wherein said complex plane plot of real and imaginary values is comprised of integral lengths, along said real and imaginary axes, enabling algorithm implementation with simple shift and add multiplication operations.

18. The approximated Kernel function utilizing receiver apparatus of claim 10 wherein said complex plane plot of real and imaginary values is comprised of integral lengths along said real and imaginary axes defining substantial angular symmetry of Kernel function locations about an origin of said complex plane plot.

19. Approximated Fourier transformation radio receiver apparatus comprising the combination of:

a microwave radio frequency radio receiver circuit having an embodied Fourier transformation frequency segregation algorithm included therein;

said embodied Fourier transformation frequency segregation algorithm including a plurality of Fourier transformation approximation Kernel function values of selected integral number real component and imaginary component magnitudes and of generally equal angular dispersions about an origin point of a real and imaginary components coordinate axis graph;

said embodied Fourier transformation frequency segregation algorithm also including a bit shift multiplication algorithm having selected of a single bit shift, a multiple bit shift, an addition and a subtraction mathematical operations embedded therein and responsive to multiplication events inclusive of said approximation Kernel function.

20. The approximated digitized Fourier transformation Kernel function receiver having:

digitized approximated Kernel function value locations disposed adjacent a Kernel function map circle;

said Kernel function map circle being of radius dimension expressible as a power of two units along an arbitrary measurement scale, a radius dimension having a length from the numerical series of 1, 2, 4, 8, 16 and so-on units along said arbitrary measurement scale;

shift and add multiplication-susceptible integral unit lengths for each real and imaginary component of digitized Kernel function points in said Kernel function map;

substantially symmetrical digitized Kernel function point angular locations around said Kernel function map circle;

digitized Kernel function point locations adjacent said Kernel function map circle being substantially optimized for shift multiplication algorithm implementation; and

digitized Kernel function point locations adjacent said Kernel function map circle being substantially optimized for minimal approximation Kernel function spurious response generation with respect to adjacent possible approximation Kernel function locations.